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ABSTRACT

An evaluation of North Carolina's public school system is provided in this report, which uses student academic performance as a primary indicator of educational effectiveness. The first two sections describe characteristics of North Carolina and its schools, with a focus on public school population, enrollment, and funding. Section 3 focuses on student achievement and compares the performance of North Carolina students to the performance of students in other states on the Scholastic Aptitude Test, the National Assessment of Educational Progress, and the California Achievement Test. Next, 3-year trends (1989-92) in the performance of all students who participate in the statewide testing program are examined. Additionally, the performances among student subgroups are compared, with a focus on the relationship between race and achievement. Finally, student performance in a major academic area is assessed; for a number of reasons, mathematics was selected for this year's focus. (LMI)

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State of the State

Education Performance in North Carolina, 1992

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Notes

1. Data presented in this report have been previously presented in formal reports.

2. Throughout this report the latest available information is presented, including 1990 Census data. Where possible, projections are made for the 1991-92 school year. Financial information generally lags one year behind so the latest data are for 1990-91. State grade-level and end-of-course tests and the Scholastic Aptitude Test data are for the 1991-92 school year. The results from the National Assessment of Educational Progress are from 1990. Complete references are provided on the back cover.

3. The term "enrollment" and the statistical definition of "membership" are used interchangeably.

4. This report uses the following conventions, unless the need for clarity or emphasis require otherwise: (a) state test scores are reported as percentiles, except writing; (b) percentages are rounded to tenths and totals may not add to 100 because of rounding; (c) most population and finance numbers are reported to hundred thousandths and other numbers are rounded to hundredths, and (d) writing test scores are two-year averages.

Introduction

This year marks the first issue of the *State of the State–Education Performance in North Carolina*, a report required by the School Improvement and Accountability Act, enacted by the General Assembly of North Carolina in 1989. The *State of the State–Education Performance in North Carolina* is one of several reports provided annually to evaluate the state's public school system. This report monitors the health of North Carolina's education system as a whole and compares it to public school systems in the nation and other states.

Like other reports that evaluate North Carolina public schools, the *State of the State* report uses student academic performance as a primary indication of how well our schools are serving the educational needs of children and youth. It also includes information that helps define the context within which the state's schools operate. Following is a brief summary of what each section of the report contains.

Context

- The first two sections of the report define characteristics of North Carolina and its schools. Included in these sections is information about public school population, enrollment, and funding.

Student Achievement

- The third section compares the performance of North Carolina students to those in the nation and other states on the Scholastic Aptitude Test, the National Assessment of Educational Progress, and the California Achievement Test.

- The fourth section provides summaries and data that examine 3-year trends in the performance of all students who participate in the North Carolina statewide testing program. Trends at the elementary level are based on student performance on the North Carolina administration of the California Achievement Test and the state's writing, science, and social studies tests. Trends at the secondary level are based on student performance on end-of-course tests.

- The fifth section focuses on student performance in a major academic area. For a number of reasons, mathematics was selected for this year's focus. One, mathematics performance was identified as a major focus both by the State Board of Education and by the State Superintendent. Two, it is the first area of the state's revised Standard Course of Study available in the schools and tested on the new End-of-Grade Tests. Additionally, 8th grade mathematics results from the National Assessment of Educational Progress, to be released this spring, will be of particular interest, since the results should reflect the impact of the state's increased emphasis on improving mathematics performance and can be compared to the 1990 mathematics test data presented in this report.

Section 1. The Context

As North Carolina refines and works toward its educational vision and goals, the context within which the state's public schools operate provides a larger picture to guide and advise important decisions. The term "context" embraces many parts of the whole and includes information about the state's population, the characteristics of education funding sources and expenditures, the number of students enrolled in the public schools and the personnel who help to educate them.

Context is significant for several reasons: it defines the resources that support the educational system that serves North Carolina children and youth; it defines the families closely linked to the mental and physical health of our student population; and it includes factors that directly or indirectly impact student achievement. The one word that best summarizes the context within which the North Carolina public schools are operating, and will continue to operate throughout this decade, is "change."

Population

In 1990 North Carolina had a total population of 6.6 million persons: 75.6 percent white, 22.0 percent black, 1.2 percent American Indian, 1.2 percent other, including Asian. Approximately 1.2 percent were of Hispanic origin. In 1990, 51.5 percent of the state's population was female.

Of the 72 percent of the North Carolina households that contained families, 56 percent contained a married couple. About 25 percent contained a single parent with children. Currently, the number of divorces in North Carolina is increasing faster than the U.S. average, placing more and more children in households where they will be raised by single parents, in most cases by their mother.

Educational Attainment by Race (Persons 25 Years and Older) (Percentages)

	White	Black	American Indian
Less than high school	26.9	41.9	48.5
High school graduate	29.2	28.8	26.5
Some college	24.6	20.0	17.1
Bachelor's degree	13.3	6.7	5.6
Graduate/professional	6.0	2.7	2.4

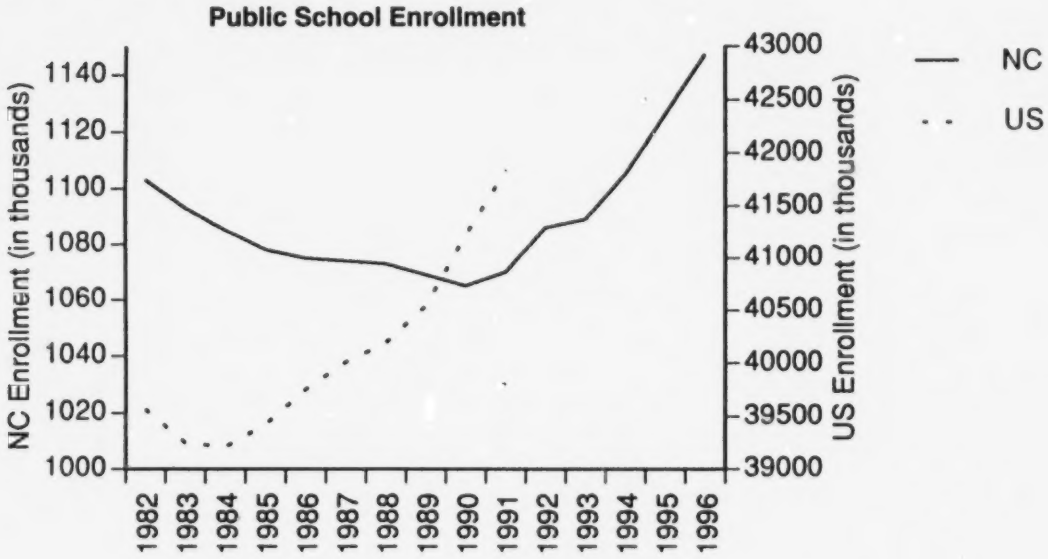
Occupation (Persons Employed Over 16 Years) (Percentages)

Managerial & professional	22.3%
Technical sales & administrative support	28.8%
Service occupations	11.4%
Farming, forestry, & fishing	2.6%
Precision production, craft, & repair	13.3%
Operators, fabricators, & laborers	21.7%

In 1989, 13 percent of the population were classified "below poverty:" 8.6 percent of white persons were classified as below poverty, 27.1 percent of blacks and 24.4 percent of American Indians. Children under the age of 18 comprised 24.2 percent of the state's total population (1.6 million children and youth). Of these children, 17.2 percent were classified "below poverty."

Public School Enrollment

From 1981 to 1983, public school enrollment in the United States declined sharply and then, in 1984, began to steadily increase. In North Carolina the decline was more gradual and continued until 1989. In 1990, enrollments began to increase and are expected to continue to rise through this decade.



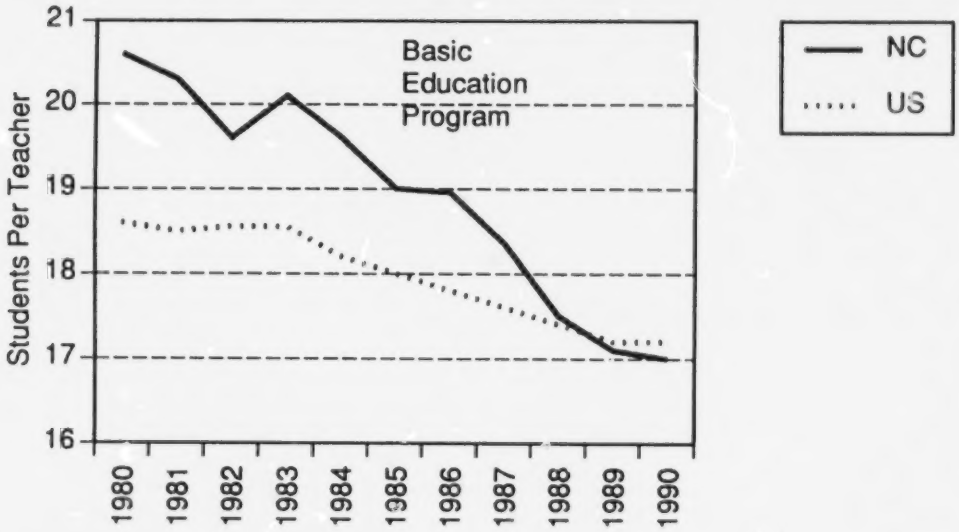
For the 1991-92 school year, there was a total school-age population of just over 1.1 million, of which 1.086 million were enrolled in public schools. North Carolina ranks tenth of all states in both population and number of students in public schools.

The racial/ethnic composition of the North Carolina public school population is somewhat different from the state's general population. Racial composition of the state's public schools in 1991-92 was 66.4 percent white, 30.2 percent black, 1.6 American Indian, and 1.8 percent other. There have been slight increases in the number of Asian and Hispanic students in the North Carolina public schools.

Public School Personnel

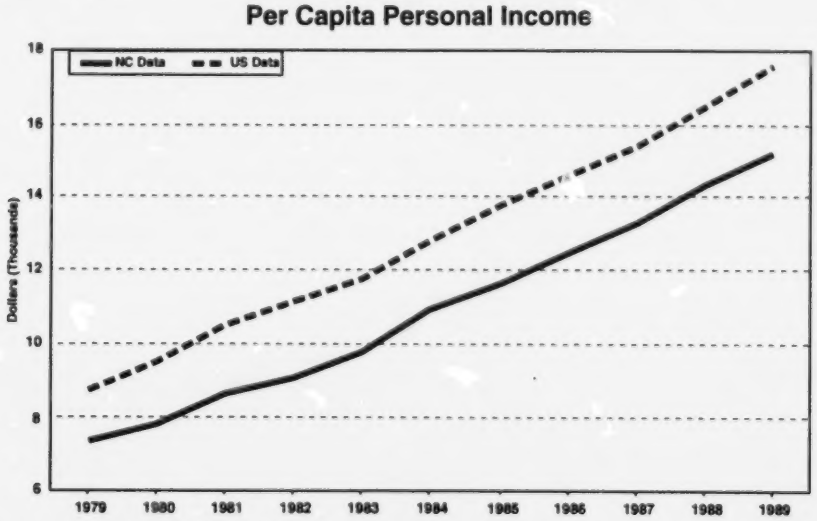
There are 1,959 public schools in North Carolina employing approximately 124,000 full-time personnel, over half of whom are teachers. There are 5,000 administrators, or 4 percent of the total public school employees. The remaining 55,700 personnel include guidance counselors, librarians, teacher assistants, and clerical and service workers.

North Carolina has improved its student/teacher ratio considerably since 1980, particularly after the implementation of the Basic Education Program in 1986.



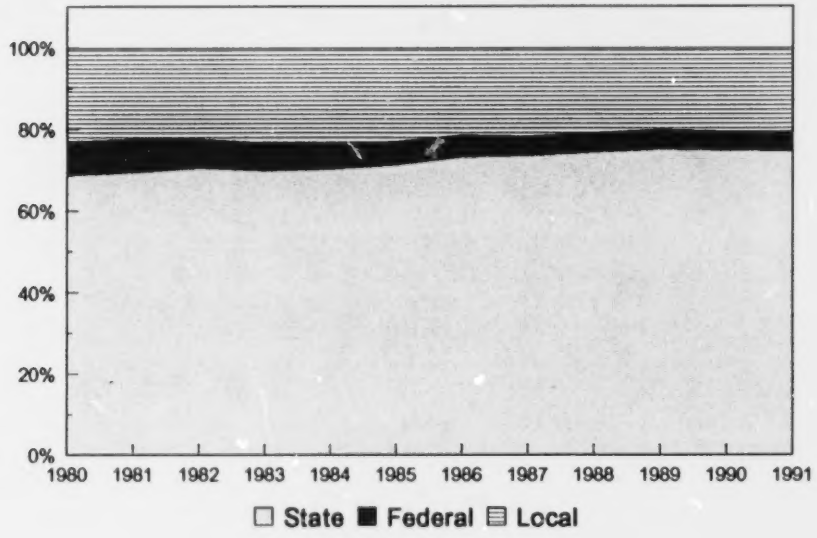
Public School Funding

North Carolina ranked 35th in per capita personal income in 1989, and 34th in per capita tax collections by state and local governments. Ten-year growth patterns parallel the nation on both indicators.



Seventy percent of the cost of operating public schools in North Carolina is borne by state government, while the national average for state support is under 50 percent. Local governments provide 45 percent nationwide, while in this state it is less than 23 percent. Over the past 10 years, the federal share of school support has declined sharply in North Carolina and stands at just over 7 percent today compared to 13 percent in 1979-80. This percentage is similar to federal funds provided other states.

Percent Expended for Public Education in N.C.



Current Expense Expenditures, in millions (1990-91)		
State	$3,220.0	70.0%
Federal	338.0	7.4%
Local	1,036.0	22.6%
Total	$4,594.0	

The per student expenditure (1990-91) in North Carolina is $4,628, compared to the national average of $4,960.

The state continues to lag the national average for teacher salaries.

National Average	$33,015
Southeast Average	$28,603
N.C.'s National Rank	29
N.C.'s Rank in the Southeast	4

Section 2. Student Achievement

A fundamental goal of North Carolina's public school system is to help all students reach their highest potential for academic achievement. The extent to which the state's schools have achieved this goal is examined in this report in three ways: by looking at national comparisons, by looking at the performance of student subgroups, and by focusing on one particular area of academic achievement.

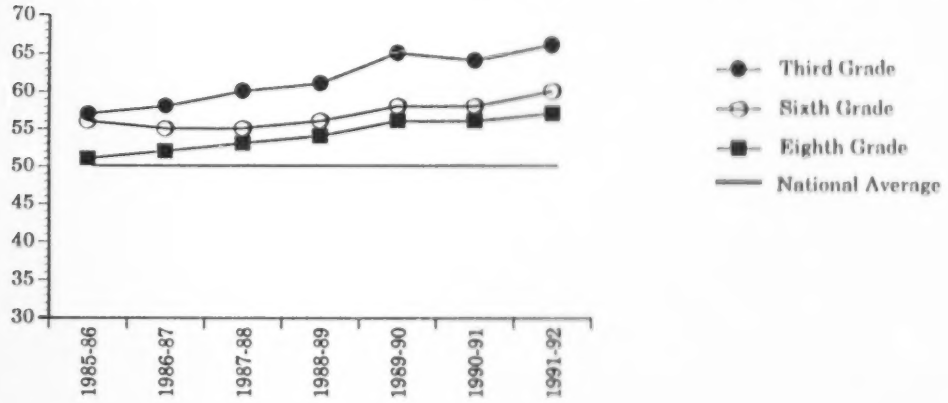
National Comparisons

Three measures are available for comparing North Carolina performance to other states and nationally. The California Achievement Test (CAT), used in the North Carolina state testing program since 1977, is a nationally normed test and permits comparisons at grades 3, 6, and 8. The Scholastic Aptitude Test (SAT) is the college entrance examination required by North Carolina universities. The SAT is taken by approximately 55 percent of our students and is reported for graduating seniors. The National Assessment of Educational Progress (NAEP) in mathematics, administered for the first time in 1990 to samples of 8th grade students in 40 individual states, permits comparisons to those states, the southeastern states, and the nation.

California Achievement Test

North Carolina students have made progress in reading and mathematics. The CAT provides a useful measure of growth in student performance on basic skills.

North Carolina California Achievement Tests (National Percentile Scores)

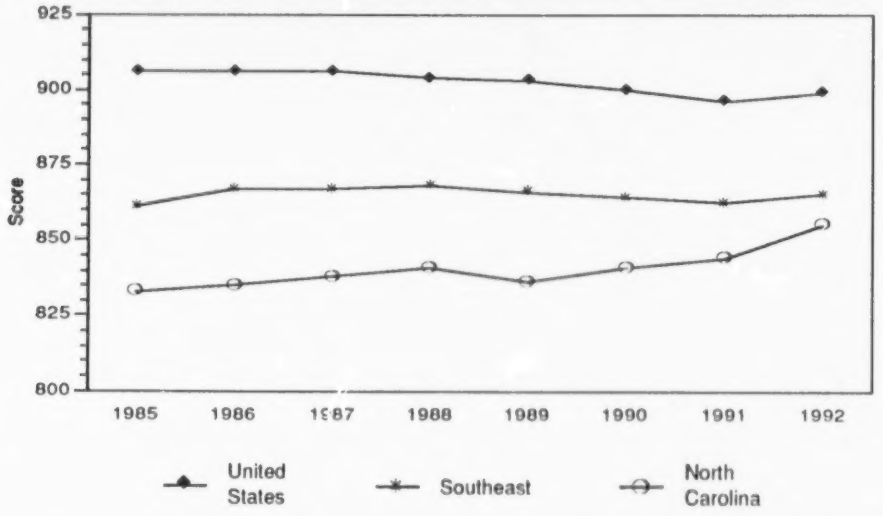


Note: The 1991-92 CAT scores are the last in this cycle of testing. The CAT has been replaced by state-developed end-of-grade tests, grades 3-8, aligned with our newly revised Standard Course of Study incorporating higher order skills.

Scholastic Aptitude Test

Since 1985, the trend for North Carolina scores on the SAT has been steadily upward, except for 1989, when a drop of 4 points caused the state to place last among all the states. Since then, the progress has been substantial, with an 11-point increase to 855 (total score) in 1992.

U.S., Southeast and North Carolina Average SAT Scores



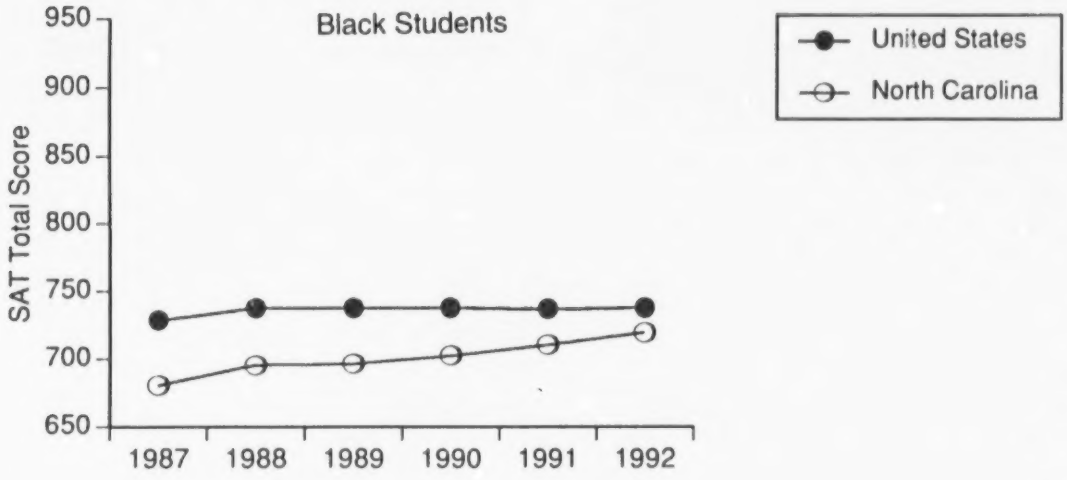
An increase of 11 points between 1989 and 1992 is particularly encouraging when compared to the 4-point decline in the national average for the same period. Compared to the southeast average, the gap has been narrowed from 33 points to 14 points during the period. North Carolina ranked 21st out of 24 states with at least 40 percent of seniors taking the SAT in 1992. It is of particular concern that only 57 percent of North Carolina graduates take the SAT.

SAT Scores for Selected States
(Percent Taking SAT in Parentheses)

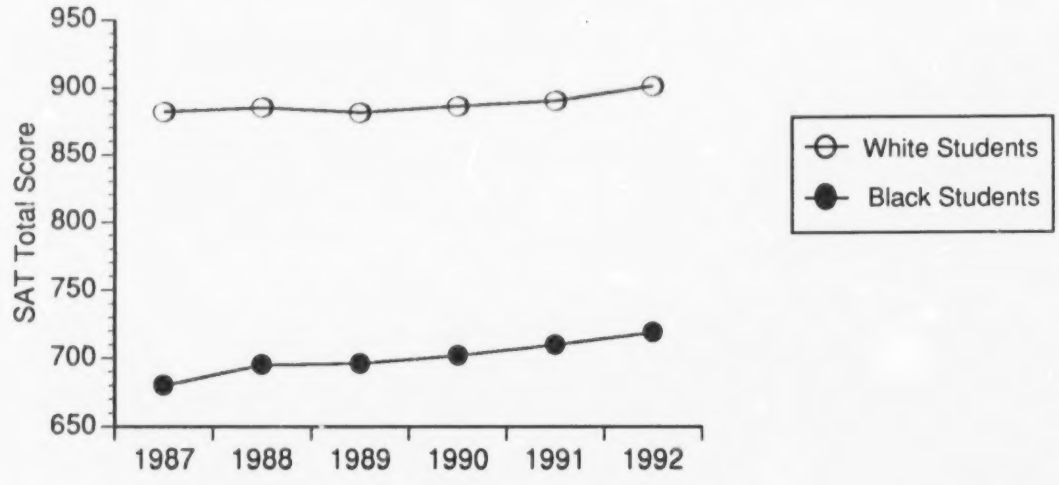
State	1990 Total	1991 Total	1992 Total	1992 Rank*
3. Connecticut (79%)	901	897	900	7
5. D.C. (73%)	850	840	842	22
6. Florida (50%)	884	882	884	13
7. Georgia (65%)	844	844	842	22
9. Indiana (58%)	867	865	868	20
13. New Hampshire (76%)	928	921	923	2
15. New York (75%)	882	881	882	14
16. North Carolina (57%)	841	844	855	21
17. Oregon (55%)	923	922	925	1
20. South Carolina (59%)	834	832	831	24
23. Virginia (63%)	895	890	893	11
24. Washington (50%)	923	913	916	3

While it is encouraging that black students in North Carolina have made greater gains on the SAT than white students and compare favorably with black students nationally, it is discouraging that they continue to score 182 points behind white students. American Indian students lag behind white students by 137 points.

United States and North Carolina SAT Scores



North Carolina SAT Scores for Black and White Students



National Assessment of Educational Progress

To date, NAEP comparisons can be made only for 8th grade mathematics test results for 1990. Descriptions of each of four proficiency levels are given on the chart, along with the percent of students who reached those levels. The proficiency of North Carolina students was less than the students in the southeast and even further behind the nation as a whole. Six percent of 8th graders, equivalent to approximately 5,000 students statewide, are below the level of simple additive reasoning and problem solving with whole numbers. (More information on NAEP is shown in the Focus on Mathematics section of this report.)

		U.S.	Southeast	N.C.
	Average Proficiency	**261**	**253**	**250**
Level	*Description*	*Percentage of Students at or Above Level*		
200	Simple Additive Reasoning and Problem Solving with Whole Numbers	97	94	94
250	Simple Multiplicative Reasoning and Two-Step Problem Solving	64	52	49
300	Reasoning and Problem Solving Involving Fractions, Decimals, Percents, Elementary Geometry and Simple Algebra	12	8	7
350	Reasoning and Problem Solving Involving Geometry, Algebra, and Beginning Statistics and Probability	0	0	0

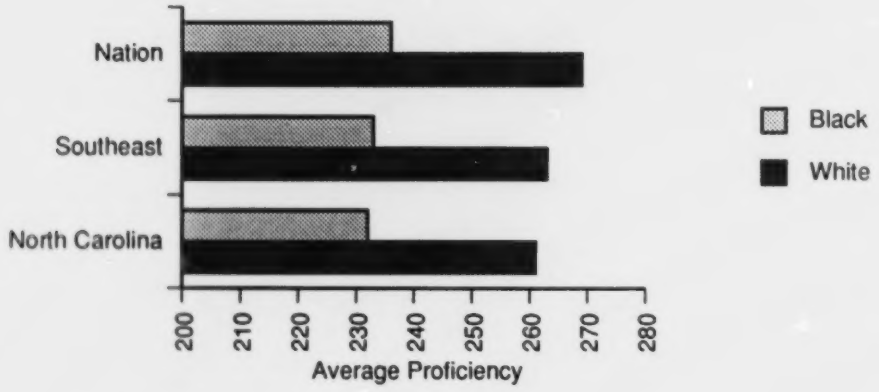
Performance of Student Subgroups

North Carolina's success depends upon the success of *all* student subgroups in school. With a primary goal of high academic achievement for *all* students, North Carolina's public schools have reason for concern. Analysis of student test scores in North Carolina indicates that almost every subgroup of students scores lower than their national counterparts.

Generally, the more advantaged the subgroup, the greater the discrepancy in scores between the state and national averages for that subgroup. For example, North Carolina A students have larger discrepancies with their national counterparts than do students who receive B's and C's. Similar patterns are evident in results from the National Assessment of Educational Progress. Advantaged urban students in North Carolina scored 12 points lower than advantaged urban students nationally, while the discrepancy between state and national disadvantaged urban students was 7 points.

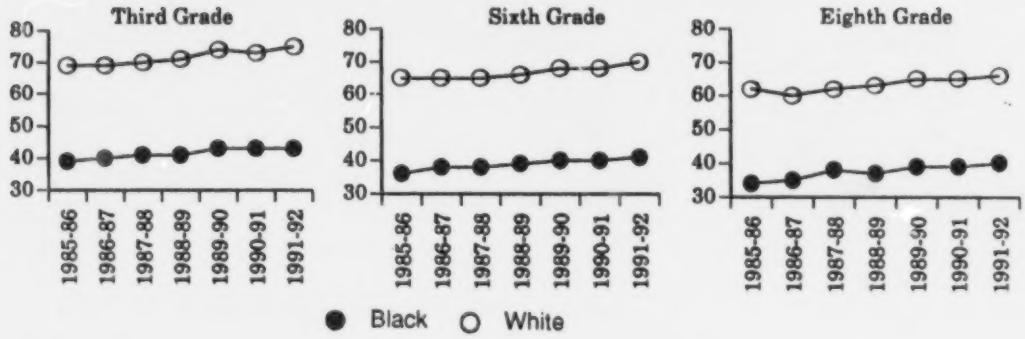
Discrepancies among all student subgroups warrant attention, but the gap between black students and white students is of special concern. Nationally and in North Carolina this gap has been characterized as a crisis. North Carolina student performance on the 1990 assessment in grade 8 mathematics was below that in the southeast and in the nation, for both black and white students. White students in North Carolina were outperformed by their counterparts in the Southeast and in the nation. Scores of North Carolina blacks were significantly lower than scores for whites, and were lower than their counterparts both in the Southeast and in the nation.

Average Eighth-Grade Mathematics Proficiency by Race



In North Carolina the gap in achievement levels between white and black students is evident in all subjects at all grade levels. Student performance on the California Achievement Tests in grades 3, 6, and 8 has improved slightly from 1986 to 1992, for both white and black students. However, since the trends for black and white students are parallel, the gap in performance between black and white students has remained generally the same since 1986.

California Achievement Test Percentile by Race

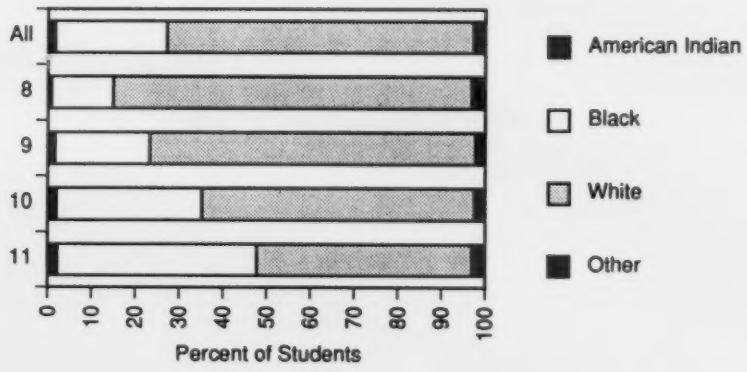


In high school, participation in the selective mathematics and science courses affects student preparedness for post-secondary education or employment in the current technological workplace. Algebra I particularly is viewed as the "gatekeeper" course for the mathematics sequence, and, ultimately, for future success.

For general academic courses, racial groups are proportionately represented: about 30 percent of all students are black, and about 30 percent of Biology and U.S. History students are black. However, black students are underrepresented in the more selective courses, representing just over 20 percent of students in Algebra II and Chemistry courses, and only 15 percent of Physics students.

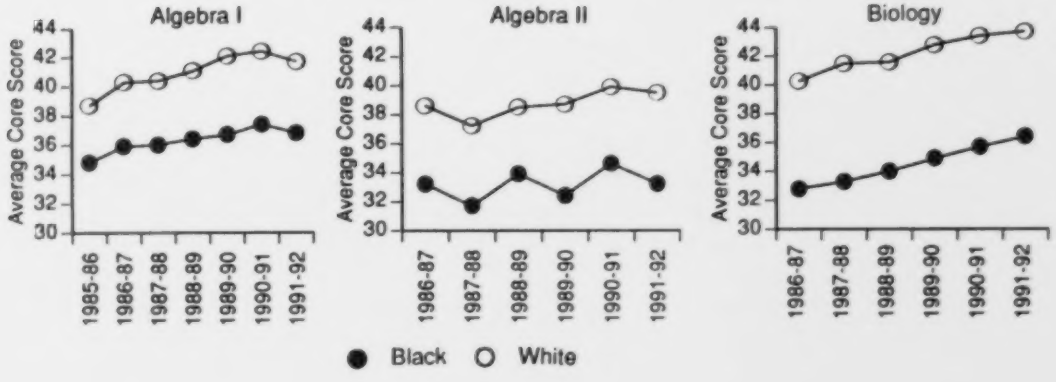
The grade in which students take courses is also important, since the earlier the initial course in a sequence is taken, the more rigorous the total program can be. Students who take Algebra I in the 8th grade may take as many as four more advanced mathematics courses. Students who do not take Algebra I until the 11th grade may only take one additional math course and, in fact, cannot meet the requirement of three advanced mathematics courses for entrance into the University of North Carolina system. Black students comprise only 14 percent of 8th grade Algebra I students and almost 46 percent of 11th grade Algebra I students.

Algebra I Students by Grade Level and Race



Overall, performance of both black and white students on the end-of-course tests has improved somewhat over the years. However, the gap in performance between black and white students has not improved.

Scores in Algebra I, Algebra II and Biology by Race



Mathematics

It is widely recognized that mathematics education must be improved significantly if today's students are to function competitively worldwide in the future. Mathematics performance of the nation's students has been the subject of numerous reports recently and will receive renewed emphasis with the release of NAEP results on February 28, 1993.

Instructional Practices

More North Carolina high school mathematics teachers held degrees in mathematics or mathematics education than did their counterparts nationwide in 1990-91. The percent of the state's 8th graders who were exposed to various teaching methods in mathematics compared favorably to others. NAEP results indicated that although North Carolina emphasized Algebra somewhat less than the national average, the communication of mathematics ideas was emphasized to a greater extent. North Carolina students used calculators at half the rate of students nationwide.

	N.C.	U.S.
Percent of all high school mathematics teachers who hold a degree in mathematics or mathematics education	79	68
Percent of public school 8th graders (1990):		
(a) who do these activities in mathematics class:		
- work in small groups at least once a week	45	49
- work with rulers, blocks, or geometric shapes at least once a week	29	28
- write reports or do projects during the school year	66	56
(b) whose mathematics teachers heavily emphasize:		
- Algebra and functions	44	50
- reasoning and analytic skills	46	45
- communicating mathematics ideas	44	37
(c) who have computers available in their mathematics classrooms	21	21
(d) who use calculators in class several times per week	15	30

Only 13 percent report doing an hour of homework each day. (Analysis of North Carolina state testing data strongly suggests that adding just one hour per day to each child's homework would improve performance by a full letter grade.)

Student Performance

Performance on state and national mathematics tests varies greatly from school system to school system, from school to school, and even from classroom to classroom. Depending upon the grade level or subject, the average score for the top third of the state's school systems is 20-25 percentile points higher than the bottom third. Similar results can be seen with the Scholastic Aptitude Test.

North Carolina Testing
Selected Mathematics Test Results - 1992 (Average of LEA Average Percentile Scores)

Test	Range	Average	Top Third of LEAs	Bottom Third of LEAs
CAT 3 Math	43.9–88.2	68.8	78.2	58.9
CAT 6 Math	28.0–81.3	62.3	72.4	51.8
CAT 8 Math	34.3–84.7	57.0	66.8	48.0
Algebra I	13.3–82.1	49.4	62.0	36.9
Algebra II	23.4–83.2	52.6	63.7	39.9
Geometry	18.2–91.6	53.8	65.6	42.3

1992 Scholastic Aptitude Test
(Average of LEA Average Scale Scores) Maximum Score = 800

	Range	Average	Top Third of LEAs	Bottom Third of LEAs
Mathematics	348-555	438	469	406

The results of the 1990 NAEP 8th grade mathematics assessment indicated that North Carolina students were not performing well compared to 8th graders nationwide. In fact, all participating states except Louisiana, the District of Columbia, Guam and the Virgin Islands scored higher than North Carolina. Although the state's average for the bottom third of its schools was only slightly less than the national average for low-scoring schools, the average for the top third of schools, as well as the overall average, fell well below the national average.

National Rank (N=40)	State	Average Proficiency	Top Third of Schools	Bottom Third of Schools
32	California	256*	275	236
33	Florida	255*	272	238
34	Alabama	252*	267	236
35	Hawaii	251*	264	233
36	**North Carolina**	**250**	**264**	**236**
37	Louisiana	246*	262	227
38	D.C.	231	247	216
38	Guam	231	**	**
40	Virgin Islands	218	**	**
	Nation	261	277	239

*No statistically significant difference from North Carolina score. **Sample size insufficient to permit reliable estimate.

Other Publications

Information in this report was extracted from the following publications which are available from the North Carolina Department of Public Instruction, 301 North Wilmington Street, Raleigh, NC 27601-2825:

How North Carolina Ranks Educationally Among the Fifty States (Information Center/ Division of Communication Services, published annually)

Trends in North Carolina Education (Division of Development Services, April 1991)

North Carolina Public Schools Statistical Profile (Information Center/Division of Communication Services, published annually)

The North Carolina 1992 Scholastic Aptitude Test Report (Division of Accountability Services; published annually)

Secondary Education in North Carolina: Report of Participation and Performance (Division of Accountability Services; published annually)

Report of Student Performance—North Carolina Testing Program (Division of Accountability Services; topical reports on elementary and middle school tests, published annually)

Other publications from which data were extracted for this report are as follows:

The National Education Goals Report—Building a Nation of Learners (U.S. Government Printing Office, Superintendent of Documents, Mail Stop: SSOP, Washington, DC 20402, published annually)

The State of Mathematics Achievement —NAEP's 1990 Assessment of the Nation and the Trial Assessment of the States (Education Information Branch, Office of Research and Improvement, U.S. Department of Education, 555 New Jersey Avenue, NW, Washington, DC 20208-5641, June 1991)

1990 Census of Population and Housing—Summary Tape File 3

A Demographic Profile of the Southeast (Unpublished Draft, Center for Demographic Policy, Institute for Educational Leadership, 1001 Connecticut Avenue, N.W., Suite 310, Washington, DC 20036, October 1992)